

*This draft intends to seek comments of all those interested on the subject, so as to introduce a mechanism for identifying the minimum quality of service standards and associated measurement, reporting and record keeping tasks except packet switched or GPRS/EDGE services for mobile communications service licensees.*

*All interested are requested send their comments and views on this draft latest by 7<sup>th</sup> January 2010. Your comments may be sent in writing, or through email to Mr. Ali Asghar, Director (Law & Regulations, PTA Headquarters F-5/1, Islamabad. E-mail: [aliasghar@pta.gov.pk](mailto:aliasghar@pta.gov.pk)*

In exercise of the powers conferred under clause (o) of sub-section (2) of section 5 of the Pakistan Telecommunication (Re-organization) Act, 1996 read with regulation 9 of the Pakistan Telecommunication Authority (Functions & Powers) Regulations, 2006 the Pakistan Telecommunication Authority hereby makes the following regulations, namely: -

#### **Part –I**

#### **Preliminary**

1. **Short Title and Commencement.**-(1) These Regulations shall be called the Cellular Mobile Network Quality of Service (QoS) Regulations, 2010.  
(2) These regulations shall come into force from the date of gazette notification.
2. **Scope and Applicability.**-(1) These regulations shall apply to all cellular mobile communication service Licensees for the purpose of identifying the minimum quality of service standards and associated measurement, reporting and record keeping tasks except packet switched or GPRS/EDGE services.
3. **Definitions.** - (1) In these regulations, unless the context otherwise requires:
  - (a) 'Act' means the Pakistan Telecommunication (Re-organization) Act, 1996;
  - (b) 'Authority' means the Pakistan Telecommunication Authority established under sub-section (1) of section 3 of the Act;
  - (c) 'KPI' means Key Performance Indicator;
  - (d) 'License' means an authorization granted by the Authority for the establishment, operation or maintenance of any telecommunication system or provision of any telecommunication service;

- (e) 'Licensee' means the grantee or holder of a mobile communication service license to which these regulations apply;
- (f) 'Mobile Communication Service' means a wireless-based telecommunications service where the terminal equipment may be connected to the telecommunications system by wireless means and used while in motion;
- (g) 'Quality of Service' means the main indicator of the performance of a mobile communications service Licensee and of the degree to which the performance conforms with the standards of such quality of service as specified in the license ,KPI or these regulations for specified parameters; and
- (h) 'Regulations' means all or any regulations issued from time to time by the Authority;

(2) Words and expressions used but not defined in these regulations shall have the meanings respectively assigned to them in the Act or the rules or the regulations, as the case may be.

## Part –II

### Measurement, Reporting and Record Keeping

**4. Quality of Service parameters in respect of which compliance reports are to be submitted to the Authority.**-(1) Every mobile communications service licensee shall meet the minimum requirements mentioned in this document or exceed the Quality of Service KPIs and benchmarks for mobile communications service specified as follows:

#### a. Voice Calls

##### (i) Network Down-time

*“the probability that the mobile services are neither available to an end customer nor display of the network indicator on the mobile equipment”.*

**Network Down-time (%) =**

$$\frac{\text{No.of un-successful network non availability instances}}{\text{Number of total instances}} \times 100\%$$

Benchmark

**Network Down-time should be < 1%**

##### (ii) Grade of Service

*“the probability that the end customer can access the mobile services when requested while it is offered by display of the network indicator on the mobile Equipment”.*

**Grade of Service (%) =**

$$\frac{\text{Total No.of un-successful calls}}{\text{Total number of calls}} \times 100\%$$

Benchmark

**Grade of Service should be  $\leq$  2%**

(iii) **Call Connection Time**

*“The time between sending of complete address information and receipt of call setup notification”*

**Call Connection Time =  $t_2 - t_1$**

Whereas,  $t_2$  = point of time where connect is established (B-party) (e.g. alerting or subscriber busy is detected by test equipment) and  
 $t_1$  = point of time when send button on mobile equipment (A-party) is pressed

Benchmark

**Call Connection Time should be  $\leq$  5 Sec**

(iv) **Call Completion Ratio**

*“The probability that a service, once obtained, will continue to be provided under given conditions for a given time duration or until deliberately terminated by either A-party or B-party”.*

$$\text{Call Completion Ratio (\%)} = \frac{\text{Total No.of intentionally terminated calls}}{\text{Total number of successful calls}} \times 100\%$$

Benchmark

**Call Completion Ratio should be  $>$  98%**

(v) **End-to-End Speech Quality**

*“The degree of speech quality that a listener perceives at the terminal with a talker at the other end”.*

**Benchmark**

**Mean Opinion Score (MOS) should be > 3 \***

*\* Measurement will be based on PESQ Algorithm (ITU-T P .862) or subsequent ITU MoS standards as approved by the Authority.*

**b. Short Message Service**

(i) **SMS Success Rate - Mobile Originated**

*“Probability that the end customer can access the short message service when requested while it is offered by display of the network indicator on the mobile equipment”.*

$$\text{SMS Success Rate (\% SMS)} = \frac{\text{Total no.of successful SMS attempts}}{\text{Total number of SMS attempts}} \times 100\%$$

**Benchmark**

**Service Accessibility should be > 99%**

(ii) **End-to-End Delivery Time**

*“The time between sending a short message to a short message center and receiving the very same short message at another mobile terminal (B-Party)”.*

**Benchmark**

**End-to-End Delivery should be < 8 seconds**

**5. Reporting Periods.**- Unless otherwise stated in these regulations, the reporting periods, which are periods of time over which measurements are taken and recorded shall be one month starting on 1<sup>st</sup> January of the applicable calendar year or as the Authority may from time to time specify/stipulate.

**6. Quality of Service Measurement.** - The Authority shall measure the performance of the Licensees using modes for collection of data or documents, including but not limited to surprise drive tests, data submitted by Licensees etc. The main aspects of the methodology for taking measurements through drive tests shall be as specified in Annex-A to these regulations. The Authority reserves the right to modify or define the values / thresholds as and when required.

**7. Measurement, reporting and record keeping tasks.**-(1) For each parameter that is reportable for a service, and for each reporting period, Licensee shall perform the following measurement, reporting and record keeping tasks:

- (a) To monitor the quality of telecommunication service being provided by the Licensee and adherence to the criteria laid down in the License and Regulations , each Licensee shall conduct periodic tests and surveys at intervals as required, or as directed by the Authority. The Licensee shall procure the test instruments and equipment as and when required for the purpose.
- (b) The tests and surveys shall be so designed as to give the overall as well as the detailed picture of various network elements, of the Quality of Service provided by the Licensee.
- (c) The Authority may specify the nature and procedure of quality tests and surveys, and may issue directions in this respect, to which the Licensee shall comply. The Licensee shall, furnish the results of the quality tests and surveys to the Authority, every month or at such intervals as the Authority may direct, in such form and manner as the Authority may specify.
- (d) The Authority may if deemed necessary, depute its own representative(s) to be present at the quality tests and surveys carried out by the Licensee.

- (e) The Licensee shall maintain record of the said quality tests and surveys, in such form and manner as the Authority may specify. This record shall at all times be open to inspection and audit by the Authority or officer of the Authority, with or without notice to the Licensee. Such record shall be retained for a period of three years.

### Part -III

#### Monitoring and Investigation by the Authority

- 8. Inspections and performance audit for Quality of Service.** - (1) The Authority shall conduct inspections, surveys, tests or make surprise checks through its designated officers or conduct performance audit for Quality of Service of the Licensee from time to time to ensure that users of telecommunication services get such Quality of Service as laid down in the License, Regulations, and/or KPIs.
- (2) The inspections may be carried out with or without representative of the Licensee.
- a) The Licensee shall extend full co-operation and provide all assistance to the inspecting officer (s) in carrying out the tests and surveys, including provision of test instruments, technical support, unhindered access to the Licensee's premises, and make available network management system and records, i.e., electronic or manual or both, whenever required by such officer.
- b) The Authority may engage, if circumstances so require, third party/consultants to conduct quality of service audit.
- (3) The inspecting officer shall prepare an inspection report of the quality of service inspections, comprising the shortfalls observed during such inspection.
- (a) This report shall be provided to the Licensee in the format as specified in these regulations as Annex-B.
- (b) The Licensee shall immediately take all remedial measures to remove the shortfalls identified in the inspection report and submit compliance report within 30 days of the issuance of the inspection report, in confirmation that all stated shortfalls have been removed.

(4) The Authority may call for such special quality tests and surveys and reports thereon, as it may deem appropriate, and the Licensee shall comply with the directives of the Authority in this regard.

#### Part-IV

#### Miscellaneous

**9. Publication of Quality of Service Reports.** \_ (1) Without prejudice to anything contained or any action required under these regulations, the Authority may publish such survey results, service audit results, and/or rating of Licensees for information of general public with or without additional notes or comments on its website and /or in any other form or manner, as it consider appropriate.

(2) For each parameter that is reportable for a service, for each reporting area and for each reporting period, measurements as published by the Authority under this regulation shall be set out in the format comprising the following information for each Licensee:

- (a) The name of service;
- (b) An identification of the reporting area for which the measurements were taken;
- (c) The measurements submitted by the Licensee;
- (d) An indication of any target for the parameter and service that has not been reached by the Licensee;
- (e) Any explanatory remarks by the Licensee, if accepted by the Authority, including but limited to remarks about changes in operational conditions that could not have reasonably been foreseen by the Licensee; and
- (f) Any other information or comparison of service quality that the Authority determines to be appropriate possibly including information to help consumers to assess the performance of Licensees.

**10. Provision of Information.**-All Licensees shall ensure the provision of complete information to the authority regarding any aspect of any provision under these regulations as and when required by the Authority.

11. The Authority may amend the QoS KPIs and benchmarks from time to time, after due consultation, following the introduction of new telecommunication technologies, consumer complaints or other events that the Authority may consider appropriate.

**DRIVE TEST /SURVEY MEASUREMENT METHODOLOGY**

**a. Voice Calls**

- Karachi
- Tier -1 (Lahore, Faisalabad & Rwp + Isd)
- Tier -2 (Quetta, Peshawar, Hyderabad, Multan)
- Tier -3 (All other locations)

**b. SMS**

**c. Percentage of ON-net & OFF-net calls/SMS**

- ON-net:
- OFF- net:

**d. B-party (terminating number)**

- Moving :
- Static:

**e. Call size/window**

- Call window:
- Pause between calls :

**f. Conduct of survey**

- PTA will carry out survey independent of CMTOs.

**g. City Coverage**

- The Drive test/survey will conducted based on the maps provided by CMTOs detailing the coverage boundaries.

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**CMTOs QoS Survey**  
**Inspection Report**

Name of Operator:

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**Part-A****General Information**

City			
Date			
Timings	HH	MM	SS
Number of Call Attempts			
Mobile Numbers (Caller and Called)			

**Part -B****Drive Test / Survey Results**

<u>Indicator</u>	<u>Minimum Target</u>	<u>Results</u>
Network Down-time (Network Accessibility)	< 1 %	
Grade of Service (Service Accessibility, end to end blocking)	<= 2 %	
Call Connection Time	<= 5 sec	
Call Completion Ratio	> 98 %	

<b>Mean Opinion Score (Average of, Average A2B plus Average B2A)</b>	<b>&gt; 3</b>	
<b>SMS Success Rate</b>	<b>≥99%</b>	
<b>End to End SMS Delivery</b>	<b>≤ 8 seconds</b>	

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